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ABSTRACT

This report (a product of the Teacher Beliefs Study) examines several different frameworks for conceptualizing and studying teachers' goals and their relationship to classroom practices. The report begins with an examination of the manner in which goals have been conceptualized by different research programs in the field of teacher thinking research. A case study is then presented of one teacher's classroom and her goal statements and explanations for her actions (drawn from classroom observations, loosely structured interviews and stimulated recall interviews). The report then describes how the evidence in the case study might be usefully conceptualized in terms of two current models of cognitive processes (script- and schema-theory). Conceptual and methodological difficulties entailed in using such models are then raised, and the report concludes by presenting an alternative framework for conceptualizing the linkages between teachers accounts of their goals and their actions in the classroom. (Author)

ISSUES IN THE STUDY OF TEACHERS' GOALS AND INTENTIONS IN THE CLASSROOM

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Abstract

This report examines several different frameworks for conceptualizing and studying teachers' goals and their relationship to classroom practices. The report begins with an examination of the manner in which goals have been conceptualized by different research programs in the field of teacher thinking research. A case study is then presented of one teacher's classroom and her goal statements and explanations for her actions (drawn from classroom observations, loosely structured interviews and stimulated recall interviews). The report then describes how the evidence in the case study might be usefully conceptualized in terms of two current models cognitive processes (script- and schema-theory). Conceptual and methodological difficulties entailed in using such models are then raised, and the report concludes by presenting an alternative framework for conceptualizing the linkages between teachers acco[illegible]s of their goals and their actions in the classroom.

ISSUES IN THE STUDY OF TEACHERS' GOALS AND INTENTIONS IN THE CLASSROOM

In moving away from a behaviorist emphasis on the "objective" description of classroom interaction, many current approaches to research on teaching have come to stress the importance of conceptualizing teachers and students as active creators of meaning in the classroom. From such a perspective, teachers' behaviors are best seen as components of meaningful agendas propelled by "intentions" and "goals." Yet while the "goal-directed" nature of teaching is widely acknowledged (e.g., Clark & Peterson, in press; Shavelson & Stern, 1981), the nature of teachers' goals are rarely scrutinized or taken as a focus of empirical research. This report examines some of the reasons why goals should be a focus of interest, and analyzes some of the conceptual and methodological problems confronting researchers who undertake their study.

The paper has the following organization. First, the conceptual importance of "goals" to the study of teacher thinking and information processing is discussed. Evidence from an exploratory study of teachers' goals and beliefs is then presented, and ways of looking at goals in terms of frameworks borrowed from cognitive psychology are examined. After summarizing some of the methodological problems encountered in the study of goals and psychological processes, the paper concludes by examining an alternative way of conceptualizing goals.

Genesis of the Problem

This report is a product of the Teacher Beliefs Study (see Nespor, 1984a), a program of research into the nature of teachers' belief systems and their role in the regulation of classroom action. The research focused

on the beliefs and classroom actions of eight experienced teachers -- two each in the subject matter areas of eighth grade English, eighth grade mathematics, eighth grade American History, and seventh grade Texas History. These teachers were observed and videotaped, usually once a week, for approximately 12 weeks. Narrative descriptions of the classrooms were constructed, using the videotapes to insure comprehensiveness and to provide verbatim accounts of classroom discourse. The videotapes were also used to conduct four "stimulated recall" interviews with each teacher. In these interviews the teachers were asked to watch the tapes of their classrooms and to describe their goals, thoughts, or decisions at particular points in the class session. Four extensive, relatively unstructured interviews were also conducted with each teacher. These interviews focused on the teachers' backgrounds, careers, and general views and beliefs about teaching; on their perceptions of the students in the classes observed; on their views about the nature and sources of discipline problems; and on the administrative and community influences that they felt affected their classroom practice.

As this research progressed, a number of conceptual and methodological problems emerged. It became clear that the teachers' "goals" and explanations were very important to their practices (at least to the ways they understood their practices). At the same time, we became less and less certain how the multitude of statements the teachers made could be systematically and coherently conceptualized: which statements were statements of goals and which retrospective rationalizations; how were the various goals organized; what was their psychological status; to what extent were the findings methodological artifacts? It seemed reasonable to assume that the first place to look for answers to such questions would be the large and growing body of research on teachers' thought processes.

The Place of Goals in the Conceptual Frameworks of Teacher Thinking Research

Teacher thinking research generally proceeds from a set of assumptions something like the following (cf. Shavelson & Stern, 1981).

1. People's actions are inextricably linked to their beliefs, intentions, knowledge, and their information-processing and decision-making skills.

2. It is usually acknowledged that the causal direction of these linkages is uncertain. That is, actions may be either, or both, the outcomes or sources of mental activities. In practice, however, several lines of research place emphasis on the role of thought as the determinant of action. For example, the National Institute of Education panel report on "Teaching as Clinical Information Processing" (1975) states that "it is obvious that what teachers do is directed in no small measure by what they think"; while Shavelson and Stern (1981) speak of the "predictable variations in teachers' behavior arising from differences in their goals, judgments, and decisions" (p. 455).

3. Flowing from the assumption that thought determines action, the argument is made that to "understand" the actions of teachers it is necessary to understand the mental activities that produced those actions.

4. The desire to understand teachers' actions stems from the realization that different teachers in similar settings may act differently. Behavioralist process-product research may allow one to predict which teacher behaviors will be correlated to gains in students' test scores, but the findings provide little insight into why the teachers act differently in the first place or how undesirable behavior patterns might be altered.

5. Underlying this position is the notion that classrooms are variable environments, that each classroom is to some extent a unique arena to which teachers must adapt their behaviors. The findings of process-product

research are seen as statistical patterns with ambiguous relevance to particular settings. To put the findings from such research to practical use it is necessary to understand the interpretive and decision-making processes through which teachers regulate their actions in different contexts (Clark, 1978, p. 1).

This framework of assumptions has served as a useful starting point for research on teacher thinking, but it raises at least three questions which have not been systematically addressed. First, there is the question of how multiple goals, inconsistent beliefs, and incomplete bodies of knowledge are actually linked to actions. Second, there are the questions of where beliefs and knowledge come from, and what sorts of external social constraints or pressures structure beliefs and knowledge. Finally, there is the question of how ecological or contextual features constrain the application of beliefs or the use of knowledge. All of these questions coalesce around the issue of how the nature and function of goals are to be conceptualized. Programs of research will differ significantly depending on which of these questions are addressed.

In research focused on the linkages between thought and action, goals are generally treated as antecedents to classroom practice. That is, teachers are viewed as entering the classroom with their goals already formulated and reified into frameworks of instructional activities. For example, according to the model developed by Shavelson and his colleagues, "teaching is a process by which teachers make reasonable judgments and decisions with the intent of optimizing student outcomes" (Shavelson & Stern, 1981, p. 471). It is acknowledged in a footnote that this model "ignores multiple, potentially conflicting goals which teachers have to

balance daily" (Shavelson & Stern, 1981, p. 471), but this is seen as a necessary simplifying assumption.

It follows from such a conception of goals that the linkage between thought and action is viewed as linear and unidirectional: There is no place in the model for feedback processes between goals and actions. Actions flow from goals, but goals are not altered or modified by action. The model is strictly hierarchical: Goals direct actions, and when action sequences do not work as desired, the teacher must make decisions among alternative courses of action to achieve the goal. The emphasis of the model is thus on the judgment and decision-making processes of teachers. The implications of the research for teacher education are also clearly defined. Because the goal of teaching is ignored or held to be non-problematic, the thrust of the research is on identifying the set of decision-making or information processing skills which seem most clearly linked to the ability of the teacher to attain the goal.

However, if it is assumed that the goal systems of teachers may differ, the focus of research shifts. The initial task becomes that of identifying teachers' goals and the conceptual frameworks they use to account for the relationship between their goals and actual performances (Fenstermacher, 1978, p. 178).

Goals, moreover, are treated not as givens or independent variables, but as products of the psychological and social contexts in which teachers act. As Fenstermacher (1978) puts it, research from this perspective aims to:

> find out whether the teachers' participation in the social system of the school does in fact account for the formation of certain subjectively reasonable beliefs [i.e., goals and modes of explanation]. The researcher could study the question of whether particular characteristics of the social system are supportive of subjectively reasonable beliefs that have been determined to be objectively unreasonable [i.e., do not, according to research, have

the consequences that the teachers believe them to have]. (p. 181)

This perspective, which is not well-developed in research on teacher thinking, raises a number of questions. For example, how are goals and modes of explanation to be identified (e.g., how can multiple and inconsistent goals be conceptualized as a framework of "subjectively reasonable beliefs")? How can goals and modes of explanation be shown to be "objectively" unreasonable (e.g., what if the goals have to do with promoting student characteristics that cannot be easily quantified or evaluated)? Finally, this framework implies that teacher education can best proceed by trying to "transform" teacher practices by using teachers' conceptualizations and logics of explanation against them: that is, taking teachers' definitions of the situation at face value and showing how they do or do not correspond to the "objective" situation (as revealed by the researcher). There are two problems with this logic. First, researchers will always be dealing with <u>their</u> models or conceptualizations of teachers' "subjectively reasonable beliefs." Using the language of teachers does not resolve the necessity of translation at some point. Second, it can be assumed that teachers hold their "subjectively reasonable beliefs" because such beliefs do provide them with satisfactory explanations. Such belief systems may be framed in nonfalsifiable terms and may be extremely resistant to attempts at "objective" evaluation.

Finally, if the focus of research is on the way in which ecological and contextual features of the teaching situation shape the formation of knowledge and beliefs and constrain their application, the adequacy of treating teachers' goals as independent units of analysis is called into question. For example, the classroom can be conceptualized as an environment putting such constraints and demands on teachers that the tasks

of establishing order, orchestrating activities, and gaining student cooperation--environmentally-defined goals--take priority. Doyle (1979a), for example, suggests that teaching should be

> conceptualized in terms of the problems posed by the classroom environment ... teachers encounter classrooms as units of time to be filled with activities that can be justified educationally and as groups of students who vary widely in aptitude and propensities for such activities. At a proximal level, then, the teacher's task as defined by these situational demands is to gain and maintain cooperation in classroom activities. (p. 47, emphasis added)

"Goals," from this perspective, are constituted by the dialectical relationship of objective constraints and teachers' prior ideologies, intentions, and goals. As Doyle (1979a) argues:

> Conceptualizing the teacher's task as primarily one of optimizing cooperation rather than learning is not a capitulation to goal displacement. It is, rather, an attempt to understand teaching as it occurs. To say that the teacher's task is to maximize learning outcomes for individual students is to define the norm of rationality for classrooms. At the same time, this definition, by focusing on outcomes, presumes that alternative courses of action can be implemented with equivalent ease. Such a view trivializes problems posed by the environment in which teachers work. The emphasis on cooperation, on the other hand, directs attention to the operations of teaching and to questions of implementation. Such questions are fundamental. (ibid, p. 48)

As a consequence (Doyle, 1979b):

> The study of classroom effects on teachers raises questions about the extent to which the things teachers do in classrooms and how they think about their work are associated with specific classroom demands rather than with the personal competence and desires of teachers or the quality of their preparation. (p. 51)

The emphasis of research from this perspective is on the strategies of information processing that teachers must use to effectively manage classroom activities. Any goals that the teachers may possess must be defined to account for the ecological constraints they face. In short, the instrumental or formal goals of obtaining a manageable classroom are seen as taking precedence over any substantive goals the teachers might possess (see Weber, 1964, for the distinction between "formal" and "substantive"

rationality). From this perspective, actions follow from goals, but at the same time goals are defined in terms of the constraints and pressures on possible courses of action.

However, even if situational constraints define the teacher's task as that of gaining student cooperation, it is not clear how "student cooperation" or the formal goals of the classroom are themselves defined, or what processes are active in their definition. If different teachers hold different definitions of cooperation, what are the sources of the differences? It is also not entirely clear how the need for student cooperation functions as an objective constraint on teacher practice. What is the accountability system? What is the sanction if teachers fail to obtain a particular level of student cooperation?

Describing Teachers' Goals and Explanations

It should be clear that no single research effort, certainly not the present one, can address all of the issues raised above. The aim of raising questions is not to attack the approaches mentioned, but to suggest that important issues remain to be resolved, and that some of the most basic of these issues revolve around the nature, development, and function of teachers' goals. The research discussed in this paper was initially inspired by Fenstermacher's (1978) arguments. We were interested in identifying the teachers' goals and the modes of logic by which they linked classroom events to the attainment of or failure to attain these goals.

Fenstermacher (1978) suggests that one way to uncover teachers' "subjectively reasonable beliefs" is simply to ask them why they act as they do. If this advice is followed, it is quite possible that the researcher will end up with a corpus of accounts in which a teacher makes

sense of his or her actions in a variety of ways. Below, we describe the accounts of one of the teachers in our study.

Mrs. Skylark explains her teaching. In a series of interviews, Mrs. Skylark (a pseudonym), an eighth-grade English teacher in her fourth year of teaching, enunciated a pair of general themes or principles (the problem of what to call them is taken up later) that guided her classroom practice. The first was the necessity of close affective bonds between teacher and students, the second was the need to keep classwork interesting and avoid routine and boredom as much as possible.

Mrs. Skylark felt that a close affective relationship between herself and her students was the basic prerequisite for student learning:

> I found that my students work better when they like me and I like them. When they know there's a mutual "like" between us, they want to work for you, and I get much more from them . . . The more I show them that I care and I like them, the more they give me, and that's what I'm looking for.
>
> I think kids want to work for you when they like you and they want to work for you. And, so I love it, I just love knowing the kids.
>
> I feel a relaxed atmosphere is important. It's important to me because it's the only way I can function. I'm not a strict disciplinarian. I also like to do fun things, and I think it makes it more fun for me, [and] for the kids, and I think more learning goes on when everyone's having a better time.

Mrs. Skylark traced this emphasis on affective ties to three sources: her own experiences as a student (she felt strongly that she learned better when she liked the teacher); educational psychology courses (though she said that these simply reinforced her common sense knowledge that people learned better when you gave them "fuzzies" and were considerate of their feelings); and the testimony of her own junior high-aged child, who claimed to learn most from the teachers she liked. Mrs. Skylark's attachment to a "relaxed" atmosphere was clearly reflected in her classroom management practices: Many minor school rules were not

strictly enforced (e.g., dress code violations, tardiness, gum-chewing, allowing students to leave the room after the beginning of class to get materials they had neglected to bring, and so on). Mrs. Skylark also dealt very mildly with off-task behaviors, talking-out-of-turn, moving around in class, and so on (problems which manifested themselves quite frequently in her class). Her main method of disciplining students (she refused to paddle them or send them to the office, although these were school norms) was to move the offending student to a different seat in the room: to socially isolate the child:

> I do get irritated and I do get annoyed. And when I do get that way, it's like, "Okay, you're bothering people over there, you're going to have to be moved. A lot of times I end up moving them to a back corner chair. It's like I'm uninviting them, I'm pushing them away from the rest of the crowd.

The relaxed atmosphere of the class and the lack of a clear management strategy seemed to encourage misbehavior: Mrs. Skylark acknowledged that she didn't know how to deal with students who refused to heed her verbal desists and did not improve upon being moved. She would simply keep moving the student to a different place in the classroom, hoping to find the spot where the student could do least harm. Such behavior pattens, she felt, derived from the students' natural desire to seek attention. In some instances, when she felt student learning was at stake, Mrs. Skylark even seemed to reward student off-task behavior:

> I find that I need to go over the same thing sometimes two, three, four and even five times. And I don't know what the answer is to that. Sometimes maybe I'm too kind and I'm too patient. I give out that same answer, or that same explanation three, four, and five times and I'll say, "This is the last time I'm going to tell you," and I'll go ahead and tell them again. And I get angry with myself for just saying, "Well, I'm sorry, that's that." I wish I would do that but I always think, well, I want them to do it--so I'll tell them.

Mrs. Skylark sympathizes with the students:

> They'll ask me three or four times. It's just amazing. But . . . I wasn't a good student in school. I mean I was, I was a B student, but I mean, I was like everyone else. I was halfway listening, halfway not listening, writing notes. I was doing exactly what they're doing. So I know exactly what's going through their mind. I know they're not listening half the time. I know they're in their mind seeing their boyfriend in the hall. I remember too well.

Students who asked for constant repetitions were even sometimes seen as virtuous:

> I'm glad he [a student] asked that question. See, he had the nerve to ask it and I'm glad. A lot of times if kids get in a teacher's classroom where, at least I remember from experience, if I was in a teacher's classroom where she would have really put me down for not knowing something. I wouldn't ask. And see, he should have known that . . . and I think he knew that, but yet he had enough nerve to ask, and so I thought "Good!" . . . He's honestly missed out somewhere and too many time kids miss out in a classroom and because of fear of what the teacher's going to say to them, they don't ask her or him and then they don't learn it and then they're lost. And so that's why I went ahead and explained it again.

As a result of her difficulties in attaining order in the classroom, Mrs. Skylark rarely completed all she had planned for a period: She and the students were usually in the middle of some activity when the buzzer rang. However, Mrs. Skylark evaluated her success or failure not in terms of the amount of material she covered, but (in keeping, it would seem, with her emphasis on a relaxed atmosphere) in terms of the quality of classroom participation:

> It wasn't a real exciting class, it was . . . rather subdued . . . I didn't feel any real excitement with the kids, any real excitement with anything special really taking place.
>
> Interviewer: Do you think the class was successful in reaching your goal [learning about commas]?
>
> Not as successful as I wanted it to be.
>
> Interviewer: How could you tell?
>
> How could I tell? Because they didn't snap back with the answers as quickly as I wanted them to, they were slow at getting it at times. The excitement, like I said: when kids pick up something

> and when they see that they're doing it right, and the answers are there for them, it's exciting, because it is faster paced: "I've got it! Hey! I know where it goes." . . . When they know it and I know they know it, you can feel it, it's almost electricity in the air.

Mrs. Skylark attributed her failure to get through as much material as she intended to the second guiding theme or principle of her teaching: the goal of avoiding boredom at all costs. For Mrs. Skylark, the best way to avoid boredom was to use a variety of activities and to talk a lot, to maintain the class's interest through her verbal performance:

> I will do a lot of talking, probably sometimes too much talking, and its because I have a variety of things going. I found that if the teacher isn't up there . . . directing the class, and she's given out the assignment, the kid will do part of it and then start sleeping on you ... If the kid doesn't know how to do something, he'll give up, and he'll get bored and sleep on you. I think it's up to the teacher to keep this kid alert, to keep the kid going . . . I think it's up to the teacher to kinda keep them motivated, and interested.
>
> If he [the student] is bored or disinterested, there's no way he's going to learn anything. . . . You've got to keep him interested and he's got to want to learn or he's not going to.
>
> I've found that the more talking I do, the more they seem to learn. I like to get a lot of student responses. I like to say, "and what's the answer to that?" and get everyone's answer. It's noiser that way, but I think it's more stimulating.
>
> I talk a lot, use a lot of stories, a lot of remembrances if I can remember. . . . I love a variety of activities. The more activities I can find, the happier I am. I don't like to be bored. I don't think they like to be bored, especially in eighth grade. Most of the time they're so jumpy and full of enthusiasm, and "What do we do now, what do we do next?" You've got to meet that enthusiasm by giving them a variety of activities.

As the last quote suggests, Mrs. Skylark was concerned with keeping her own interest at a high level as well as that of the students. By generally overloading class time with activities and taking on the burden of leading all activities herself--in an environment with a minimum of routinization and a system of management based almost entirely on her personal charisma, Mrs. Skylark's classroom practice was characterized by a large number of what Kounin (1970) referred to as "thrusts," "dangles,"

and "flip-flops." Mrs. Skylark was forced to constantly shift the focus of her attention and energy to repair the unravelling threads keeping together the "perilous equilibrium" of her classroom.

While Mrs. Skylark consistently stressed the goals of maintaining a relaxed atmosphere and avoiding boredom (and acted in ways comprehensible in terms of these goals), they were not her only aims. For example, when asked about the "goals" of particular class sessions (during the stimulated recall interviews), Mrs. Skylark always framed her answers in terms of subject matter skills:

> My goals today are . . . I want them to be able to recognize the difference between just what a clause is, and a sentence . . . I still get clauses instead of sentences. And so I thought, "Well, we'll just work on that some more." And then I wanted to work into what simple sentences, compound sentences, and complex sentences are, so that they can be able to look at a sentence and say, "Oh, this is a complex sentence, it consists of a dependent clause and an independent clause."

Some of these subject matter goals had a peculiar status. They were not so much personal goals, goals defined by Mrs. Skylark on the basis of her subjective beliefs about teaching English, as they were goals that were more or less inherent in the position--"givens" for English teachers. As Mrs. Skylark explained, she did not at all expect to attain this subject matter goal (i.e., have all her students learn to recognize sentences and differentiate among types of sentences):

> You always wish they would, but this was the goal last year too, of course. And you reach the goal with some of them, but you only gain a little bit each year. You know, you're idealistic, sure you'd love to reach this goal and say every kid in the room has learned to be able to tell me what a complex sentence is and what a compound sentence is, and every kid in this room can do this or that --but you don't. You catch a few here and a few there . . . They'll work on this till they're seniors in high school, they really will . . . With English it's just a repeat--year to year to year: same thing.

Lessons consisted of a number of activities, each of which can be seen as attached to a goal or set of goals. For example, in the lesson on types of sentences referred to in the quote above, Mrs. Skylark began the class by having a student read the definitions of "sentence," "clause," and "phrase" from the textbook. When the student finished reading Mrs. Skylark paraphrased what the book had said. In the stimulated recall interview she volunteered this explanation:

> I like to rephrase what they read. I want them to read it, I want them to see it on the page. I want them to know it's there. However, I know that when they read things, many times they're just reading words and they just look at the page and it doesn't sink in. So I always will start rephrasing what has been said, feeling like what they missed, maybe they'll pick up...
>
> Interviewer: Why do you have the kids read it in the first place?
>
> Well, one of the reasons is to settle them down. It settles them down. Another thing is they have the written work material in front of them. That way when I start rephrasing, they can look back if I call on them to answer a question, and it's there. For some of them, they pick it up better if they read it. Others don't and that's why we rephrase. But there's numerous reasons why we do need to read it.

In short, the simple act of having students read seems to address several different goals or purposes: it serves a management function, quieting the students down, it provides the students with a prop (a text passage) and focuses their attention on the relevant section of the text, and it provides Mrs. Skylark with an opening to elaborate the content verbally (of course, it could be that these are all post hoc rationalizations--a discussion of such issues is being saved until later in the paper).

Conceptualizing Mrs. Skylark's explanations as reflections of cognitive structure

The description of Mrs. Skylark's classroom and the enumeration of her "goals" could be extended. However, the sample of her views above should be

sufficient to suggest that goals are multiple, ambiguous, and related to action in various ways. How can all of this be conceptualized? That a conceptual framework is needed is clear if one considers, for example, the kinds of difficulties the situation described above creates for one interested in pursuing Fenstermacher's (1978) program for the study of "subjectively reasonable beliefs." How do Mrs. Skylark's goals and modes of explanation fit together? How could their "objective reasonableness" be evaluated? One needs, at the least, a comprehensive and systematic language for talking about beliefs before such questions can be addressed.

One approach to the problem of conceptualization in teacher thinking research has been the systematization and labeling of teachers' statements, and their presentation as sets of beliefs or "principles." The works of Marland (1977) and Conners (1978) are good examples of this approach. However, while this practice has heuristic value, it leads to a conceptual dead-end: The "principles" identified are post hoc constructions of the researchers. Their epistemological status is far from clear. An alternative and seemingly promising way of proceeding is to draw upon cognitive psychology for concepts that can be used to develop more comprehensive and coherent frameworks for describing teachers' goals and beliefs. Examples of this approach are described below.

Script theory. One well-known model of cognition is Schank and Abelson's (1977) theory of "scripts." The theory was developed to allow computer modeling of text comprehension and entails a number of concepts (e.g., "conceptual dependency theory," a particular conceptualization of "episodic memory," and a number of assumptions about cognitive primitives) that will not be discussed here. Instead, the focus will be on the concepts of "scripts," "plans," and "themes." A script (Schank & Abelson, 1977) is defined as:

> A structure that describes appropriate sequences of events in a particular context. . . . Scripts handle stylized everyday situations. They are not subject to much change, nor do they provide the apparatus for handling totally novel situations. Thus, a script is a predetermined, stereotyped sequence of actions that defines a well-known situation. (p. 41)

The script concept has already been introduced into the literature on teacher thinking--generally to refer to teachers' instructional tasks (Shavelson & Stern, 1981). One can also see how the concept could be used to describe such routinized practices as Mrs. Skylark's use of student reading to settle down the students at the beginning of class and to focus their attention, and her practice of paraphrasing what the students read [this is, strictly speaking, a "personal script" (Schank & Abelson, 1977, p. 62) as opposed to an "instrumental script" such as calling the roll]. But how are we to describe other aspects of Mrs. Skylark's cognitive organization of instruction: for example, her belief that students must learn to distinguish between sentences and clauses before they can learn to distinguish between different types of sentences--or for that matter, her belief that the students should learn to distinguish clauses and sentences at all? Here, Schank and Abelson's concept of a "plan" is useful. Scripts, it will be recalled, are geared to stereotyped, highly routinized event sequences. "Plans" are called into play when such routinization is absent. According to Schank & Abelson (1977), scripts are context-specific, plans are general:

> A plan is intended to be the repository for general information that will connect events that cannot be connected by use of an available script or by standard causal chain expansion. . . . A plan explains how a given state or event was prerequisite for, or derivative from, another state or event. (p. 72)

> Plans form the general mechanism that underlies scripts. That is, they provide the mechanism for understanding events about which there is not specific information. (p. 97)

Thus the sets of content-focused goals that Mrs. Skylark used to describe her intentions for a given class period can be conceptualized in terms of her "plans." This leaves the problem of describing the sorts of general principles or goals that suffused Mrs. Skylark's system of instruction (i.e., the emphases on having a relaxed atmosphere and on avoiding boredom). Here, Schank and Abelson's (1977) concept of "themes" is applicable:

> Themes . . . contain the background information upon which we base our predictions that an individual will have a certain goal. We postulate three categories of themes: role, interpersonal, and life themes. Each represents a particular type of predisposition of an actor. Each is characterized by a different kind of rule linking the predisposition to a goal from a specifiable goal set, via particular instigating circumstances. The purpose of a theme is to account for the existence of a goal as well as to make predictions about future goals. If there were no themes, goals would appear as isolated entities without connection to the rest of what is known about a situation. A theme is essentially a generator of related goals. When a theme is identified it makes sense of a person's behavior by providing a prior context for his actions. (p. 132)

The framework described above could serve to orient research on teachers' goals in several ways. If we were interested in understanding how goals are conditioned by the ecological constraints of classrooms, it would be useful to examine classroom scripts (as opposed to plans or themes). This would entail extensive observations of classroom interactions with the aim of identifying the stereotyped situations or standard event sequences of the classes. Analysis would then focus on the ways these script-like activities were inserted or manifested in the vectors of classroom processes (that is, the aim of analysis would be to find the contexts of use of the script-like activities). One would attempt to discover the points within particular vectors of activities at which certain scripts were invoked, to find instances in which similar scripts were invoked at different points in vectors, or to find instances where different scripts were invoked at

similar vector-points. Only after analysis had reached this point would intensive interviewing of teachers take place, with the focus of the interviews being on both what the goals of the scripts were, and why they were invoked in particular contexts of use.

If, on the other hand, one were interested in examining the intentionalist position proposed by Fenstermacher--in discovering why particular vectors of action were initiated in the first place--the research would be oriented towards an examination of the "themes" that guided the teachers' practices. In another report (Nespor, 1984b) I have suggested that one profitable way of undertaking this task is to look at the nature of teachers' "commitments" to teaching (Becker, 1970; Woods, 1979, 1981), and the ways they orient their actions and focus their attention in terms of particular components of their workplace environments. For example, teachers commited to teaching as a form of "labor" formulate their classroom goals and act in ways quite different than teachers who are commited to teaching as a "profession" defined by a body of specialized knowledge. Patterns of commitment also seemed to be linked to social organizational characteristics of the schools in which teachers work.

The "script theory" framework thus does not answer questions so much as it provides a way to frame research questions more profitably. However, the Schank and Abelson model of cognition is by no means the only one available. Let us examine an alternative framework of concepts.

Schema theory. A "schema" is a knowledge structure. It is a procedurally-organized array of variables, a way of structuring information. More general than a "script," a schema subsumes the notion of "plan" but goes beyond it. Though there are currently many different ways of conceptualizing schemata (see e.g., de Beaugrande, 1980; Tannen,

1979), I will follow Rumelhart's usage here (Rumelhart, 1980; Rumelhart & Norman, 1981).

Rumelhart (1980, pp. 36-38) introduces the construct of schemata by using the concepts of "plays" and "theories" as analogies. A schema is similar to a play in the sense that, just as a play contains characters and roles which can be filled by various actors without changing the basic structure of the play, a schema can be thought of as composed of slots or variables which can be filled with different sorts of content without altering the essential structure of the schema. A schema is also a framework for constructing interpretations of reality. Like a theory, a schema is constantly compared and evaluated against reality. If the schema fails to account for observable features of the environment, it can be discarded or modified. Schema-based comprehension thus proceeds in a fashion analogous to processes such as hypothesis-testing, evaluation of goodness of fit, and pattern matching.

As Rumelhart notes, both the "play" and "theory" analogies may be somewhat misleading because they suggest a rigidity and lack of adaptive capacity. Schemata, in contrast, are modifiable (through "accretion," "tuning," or "restructuring"), and thus need not be simply accepted or rejected in toto. Moreover, Rumelhart (1980) argues that both of the analogies, while useful, fail to capture two crucial characteristics of schemata:

> In the first place, plays and theories are passive. Schemata are active. In the second place, the relationship between a theory and its constituent subtheories or between a play and its constituent subplays are not always evident. Schemata, on the other hand, have a very well-defined constituent structure.
>
> In both of these ways, schemata resemble procedures or computer programs. Schemata are active computational devices capable of evaluating the quality of their own fit to the available data. That is, a schema should be viewed as a procedure whose function is

to determine whether, and to what degree, it accounts for the pattern of observations.

> The second characteristic that schemata share with procedures is a structural one. Procedures normally consist of a network (or a tree) of subprocedures. A particular procedure normally carries out its task by invoking a pattern of subprocedures, each of which in turn operates by invoking its subprocedures. Each procedure or subprocedure can return values that can serve as conditions determining which other subprocedures, if any, are to be invoked. So it is with schemata. A schema is a network (or possibly a tree) of subschemata, each of which carries out its assigned task of evaluating its goodness of fit whenever activated. These subschemata represent the conceptual constituents of the concept being presented. (pp. 38-39)

A description of Mrs. Skylark's system of beliefs and actions in terms of schema theory might look something like this:

Mrs. Skylark comprehends her classroom on the basis of a diverse set of schemata. Two of these schemata--corresponding to "relaxed atmosphere" and "avoidance of boredom" are composed of a very large number of sub-schemata. For example, the sub-schemata of the "relaxed atmosphere" schema would consists of schemata comprised of variables having to do with warm affective ties, personal interest, the feelings of students, and so on. Mrs. Skylark also has schemata dealing with content and sequencing of content, and with issues of managing and pacing the classroom. However, these schemata account for a smaller array of variables than the "relaxed atmosphere" and "avoid boredom" schemata. Thus, it is much more likely that a value or event would be bound to one of these two schemata than to content-focused or management-focused schemata. When a student disrupts Mrs. Skylark's classroom or initiates a topic unrelated to the content, Mrs. Skylark is more likely to "read" this event in terms of the "relaxed atmosphere" schemata than in terms of the other types of schemata. That is, she is more concerned with the student's feelings and the friendly climate of the classroom than with pushing ahead with instruction. However, content and management related

schemata are instantiated by default when "relaxed atmosphere" or "avoid boredom" schemata are inapplicable (e.g., beginning the class or planning the content focus--though in the latter case the "avoid boredom" schema sometimes becomes relevant and Mrs. Skylark introduces what she considers to be a more exciting content focus: e.g., reading aloud from a novel or doing a play from the Junior Scholastic magazine).

The discussion above is merely intended to be suggestive. There are alternative ways of looking at the situation in terms of schema theory. For example, one could emphasize, not the structure of the schemata, but their function or type--one could distinguish between "formatting" and "content" schemata (e.g., schemata defining the formal structure of permissible classroom behavior versus schemata geared to particular transient event sequences carried out by specific participants) (de Beaugrande, 1981, p. 303). One could also examine the different types of operations that may occur with schemata. For example, one distinction commonly made is between cognitive processing that is "conceptually-driven" and processing that is "data-driven" (Rumelhart, 1980, pp. 41-42; see also Frederiksen, 1977, for the similar notion of "schema-based" versus "text-based" processing).

In conceptually-driven processing higher level expectations guide perception and comprehension by directing the activation of constituent sub-schemata. In data-driven processing, the activation of sub-schemata (in many cases taking place automatically) causes the activation of the various schemata of which it may be a part (cf. Morine-Dershimer's, 1978-79, distinction between "image-oriented" and "reality-oriented" teacher information processing). In normal situations (i.e., that of socially competent actors in reasonably familiar settings) comprehension takes

place through both processes (this is called "interactive processing"). However, actors in unusual or unfamiliar settings may rely more on "data-driven" processing (e.g., as suggested by eye-movement studies of readers confronted with unusually difficult or distorted text). The notion of interactive processing, for example, provides a possible way of dealing with situations where teachers account for their actions in terms of multiple modes of explanation (e.g., Mrs. Skylark explaining why she started the class with the student reading aloud): The action makes sense in terms of both data-driven schemata (the classroom management function of oral reading) and conceptually-driven schemata (it helps students learn by providing information through different communicative media).

Where does one get with this sort of conceptual framework? Again, it is a matter of providing new ways to look at issues. For example, from a schema framework the researcher is led to ask the questions: What sorts of modes of explanation (i.e., schemata) are brought to bear on (i.e., are instantiated to explain) what types of classroom events (i.e., values)? To what extent are these modes of explanation complementary (i.e., to what extent are they used to account for distinct sorts of events) and to what extent are they in conflict (i.e., used to account for the same sorts of events at different points in time)? From Doyle's ecological perspective one could ask: How do the objective constraints of the classroom produce events more likely to induce the instantiation of one type of schemata than another? From Fenstermacher's intentionalist perspective, one could address the "objective reasonableness" of teacher practices by showing teachers how the same or similar events could be interpreted through different schemata (both the teachers' and schemata introduced by the researcher).

I hope to have shown that both "script" and "schema" theory have some potential for making sense of teacher beliefs and for framing research

questions in a useful way. But what if they do not accurately describe how understanding occurs? In fact, serious questions can be raised about the utility of conceptualizing cognition in terms of global knowledge structures such as "scripts" and "schemata." For example, it could be argued that rather than being guided by scripts or schemata, comprehension occurs in large part through the simultaneous parallel processing of many different alternative hypotheses framed at different levels of the event. Woods (1980, pp. 78-79), for example, argues this position, suggesting that the general use of schema-like constructs to control hypothesis formation in cognitive science models of human understanding is a product of the fact that these are much less expensive to program on computers than models entailing parallel processing of multiple alternative hypotheses.

From a very different perspective, Winograd (1981), who played an important role in the development of cognitive models based on global knowledge structures, now expresses serious misgivings about the utility of this approach. Drawing upon the arguments of the biologist Maturana (1977) regarding description in biology, Winograd (1981) suggests that any system of activity or structure can be described in terms of many different "domains:"

> For example, we can look at a TV screen and see an array of luminescent dots excited by a moving electron beam, or we can see a comedian telling jokes. We can talk coherently about what we see in either domain, but cannot combine them meaningfully. Maturana argues that in describing cognition we often fail to carefully distinguish the relevant domains. The error takes the form:
>
> 1. A scientist observes some recurrent pattern of interactions of an organism.
> 2. He or she devises some formal representation (for example a set of generative rules or a "schema") that characterizes the regularities.
> 3. The organism is assumed to "have" the representation, in order to be able to exhibit the regularities.

4. (Depending on the particular sub-field) The scientist looks for experiments that will demonstrate the presence of the representation, or designs a computer program using it to see whether the behavior can be generated by the program. (pp. 248-249)

Winograd (1981) argues that the problem with this procedure is the reification that takes place in the third step.

> There is a good deal of confusion of domains apparent in the work on "schemas," "scripts," and "frames." Some kind of regularity is observed in text patterns, or the ability to answer certain kinds of questions given text. The cognitive researcher builds a formal representation of this pattern, and often builds some kind of program that uses it to produce minor variants on the observed behavior [or devises an experiment whose results can be explicated in terms of the representation]. The resulting claim is that a person must "have" the script or schema and use it explicitly (perhaps not consciously) in carrying out the process. . . . [Reflecting on his own work within this perspective, Winograd continues] I still feel that the kinds of phenomena that were pointed out and categorized were interesting and important, but dressing up the observations in the language of schemas did little or nothing to sharpen or develop them. . . . The schemas correspond to classes of external behavior, which may not correlate in any straightforward way to the components of the internal mechanism (either physical or functional). (pp. 249-250, emphasis in original)

While the utilization of cognitive models in research on teaching over the last decade has led to valuable new ways of formulating issues and exploring them, it should be clear that Winograd's criticisms apply to what I did earlier with my discussion of Mrs. Skylark, and to much of the teacher thinking research that utilizes terms or concepts taken from cognitive science. The researcher is in something of a quandary. There is reason to believe that understanding the thoughts, beliefs, goals, etc., of actors is important for understanding the social processes in which they participate. But there are a variety of ways of conceptualizing thought, and no clear criteria for choosing among alternatives (for example, "script" and "schema" theory differ on some very important points, but both could describe Mrs. Skylark's classroom; there is no clear way to determine that one is superior to the other). Moreover, this situation may be inescapable insofar as all formal representational systems for cognition are essentially

only plausible models corresponding to observable regularities and uncertainly linked to internal cognitive processes. This would not be so troublesome--after all, no theories are ever truly "verified," there is a background assumption to scientific inquiry that all theories are progressively falsified and discarded--were it not for the fact that fundamental methodological difficulties militate against the liklihood of ever satisfactorily "testing" the various competing models.

Methodological difficulties of studying on-line cognition in natural settings

One of the basic facts about research on cognition is that there is a very fine line between how one obtains data and what kind of data one obtains. There is an inherent circularity in the arguments about the validity of self-reports of thought processes: The data or evidence which are used to test or support theoretical constructs are themselves products of untested theoretical assumptions. Thus, if one views cognition as entailing the heavily automatized parallel processing of information (e.g., Woods, 1980)--or if cognitive structures are viewed as forms of procedural knowledge (e.g., Rumelhart & Norman, 1981)--then by definition it is impossible for persons to verbally reconstruct what they are thinking about at any given time. From these perspectives, self-report data are imprecise and ambiguous reflections of thought. On the other hand, if one adopts a position such as that advanced by Ericsson and Simon (1980), then it is possible to argue that people may have access to their thoughts as they perform tasks. Self-reports taken "on-line," as people perform tasks, can be considered reasonable evidence of thought processes about the task being undertaken--though even from this perspective, the reconstruction of thoughts after the fact is of dubious validity. Norman (1983) provides an overview of some of the major problems encountered in studying cognition:

> Discovering what a person's mental model is like is not easily accomplished. For example, you cannot simply go up to the person and ask. Verbal protocols taken while the person does a task will be informative, but incomplete. Moreover, they may yield erroneous information, for people may state (and actually believe) that they believe one thing, but act in quite a different manner. All of a person's belief structures are not available to inspection, especially when some of those beliefs may be of a procedural nature. And finally, there are problems with what is called the "demand structure" of the situation. If you ask people why or how they have done something, they are apt to feel compelled to give a reason, even if they did not have one prior to your question. They are apt to tell you what they believe you want to hear (using their mental models of your expectations). Having then generated a reason for you, they may then believe it themselves, even though it was generated on the spot to answer your question. (p. 11)

In light of the difficulties of observing and analyzing thought processes in real-world tasks, laboratory based investigations are sometimes undertaken. But experimental techniques for capturing judgment and decision making processes (such as policy capturing) generally suffer from a lack of ecological validity (Ebbensen & Konecni, 1980)--that is, the experimental task situation is so far removed from real world task situations as to make the experimental findings incommensurable to real world processes. The usefulness of experimental research on thought processes thus depends on a thorough (and as yet unattained) understanding of the nature and relationships of tasks in everyday life and laboratory settings (Cole & Means, 1981; Griffin, Cole & Newman, 1982).

At present, then, process tracing or "thinking aloud" protocols arguably produce the most valid information about thought processes (Ericsson & Simon, 1980)--especially if the subjects are asked to "describe" what they are doing rather than to produce explanations (Norman, 1983; but cf. Schoenfeld, 1983). The general idea is that one has access to short-term memory as one performs the task, whereas this is not available when one attempts to construct the steps of past cognitions. Such techniques have been used in educational research to study, for example,

teacher planning processes (Yinger & Clark, 1983). There are, however, limitations to this approach. First, it can be used to study cognition only over relatively short spans of time. Activities that span long periods of time or discontinuous segments of time can be studied only in an artificial, snap-shot fashion. For example, the findings from the many studies currently using this technique to examine writing processes (e.g., Flower & Hayes, 1980) have an ambiguous relevance to our understanding of how people write papers or articles over many hours, days or weeks. Second, if cognition consists of multiple processes (some of them automatized) taking place simultaneously, then by definition an actor cannot attend to all of these at once, let alone produce verbal reports of them. Third, activities that involve social interaction are not amenable to this kind of research: to have the subjects speak aloud about their thoughts would distort the activity itself. To have teachers talk about what they were thinking as they actually teach would transform the activity of teaching.

This last consideration has led to the use of "stimulated recall" interviews (Clark & Peterson, in press) in which teachers are asked to watch videotapes of themselves in the classroom and explain what they were thinking at various points during the class. However, this technique (which produced much of my data on Mrs. Skylark) entails a number of difficulties.

First, the stimulated recall interview is a task in which teachers are asked to look at their classrooms from an unaccustomed perspective and explain what they are thinking about and why they are doing what they're doing. This is a peculiar sort of task, not something the teacher is likely to encounter often in the usual course of events. The effects of the unusual task setting have not been examined. Teachers'

motivations, attitudes, and assumptions about the stimulated recalls are not well studied or understood. In addition to this, a number of other confounding factors may intrude. The teachers may differ greatly in their verbal facility. Odell (1981), for example, reports that in process tracing studies expert writers sometimes had difficulty explaining what they were thinking about as they wrote. It seems unreasonable to conclude from this that such writers do not think or make decisions as they write, rather, it must be that their decision making processes are automatized, or that they have trouble articulating their thoughts, or something along such lines. Similarly, the fact that teachers do or do not mention making a decision or considering particular courses of action cannot be taken as evidence that no decisions were made and no alternatives considered.

Another problem is that the teacher viewing a tape of his or her classroom is viewing a different stimulus environment than the one they encountered in actually teaching the class. This is true for two reasons. First, there is a general consensus that human memory involves at least constructive and probably reconstructive processes: constructive in the sense that what is stored in memory is not a direct picture or representation of the perceived environment, but a representation constructed on the basis of prior knowledge and a selective processing of information; reconstructive in the sense that the constructed representation continues to be modified by the on-going processing of information encountered later (de Beaugrande, 1981; Loftus, 1979). Thus what the teacher sees at the end of the day on the videotape is an event about which the teacher possesses interpretive frameworks quite different from the ones he or she possessed as the class actually unfolded. The second reason the videotape stimulus is different than the one originally encountered by the teacher is obvious: The film is shot from a different

part of the room. Joyce (1978-79) notes, for example, that teachers in the South Bay study frequently commented that they were seeing things on the tape that they had not seen in class. As Mrs. Skylark put in during a stimulated recall: "Look at him!! I love it. The camera picks up stuff that I just don't see." Teachers in the present study expressed similar sentiments (see Nespor, 1984a, for a more extensive discussion of stimulated recall methodology).

The point of this discussion is not to dispute that stimulated recall interviews can provide useful information about how teachers think about classroom processes. It does, however, question the notion that teachers' accounts can be treated as accurate or representative descriptions of their "interactive" or on-line thought processes during instruction. The next section examines an alternative way of interpreting the teachers' accounts.

Alternative Approaches to the Study of Teachers' Goals

Teacher thinking research is generally defined as the study of the internal knowledge structures and thought processes of teachers. But as the issues raised in the preceding sections suggest, research proceeding along these lines faces fundamental problems. Teachers' accounts of their actions--such as those of Mrs. Skylark, reviewed earlier--cannot be assumed to reflect the internal processing, decision making, or on-line thinking that the teachers engage in during instruction. At the same time, such accounts clearly have some relationship to how teachers think and teach. This section presents the outlines of a perspective for conceptualizing this relationship as a complex form of retrospective sense-making carried out for particular purposes in particular contexts. However, it should first be acknowledged that the problems raised earlier do not imply any necessity to abandon research on the internal thought processes of teachers. Such

research should still prove valuable if more attention is paid to making a self-conscious and rigorous acknowledgement of the ambiguous theoretical status of the models and constructs used for describing thought; and if more care is taken in analyzing and understanding the relationships among the different task environments in which people carry out everyday activities and the task environments in which they provide researchers with information about their internal cognitive processing.

The remainder of this report, however, takes a different tack. Instead of treating "goals," "intentions," "knowledge structures," and the like as if they were entirely internal, intra-psychological phenomena, the report draws on several theoretical perspectives which look at these knowledge structures as components and products of social interaction. From these perspectives, "goals" and "intentions" can be viewed as retrospective attempts to make sense of past actions.

Understanding as retrospective sense-making. It is generally acknowledged that people possess goals, desires, intentions and purposes, and that these are linked to their actions. But how they are linked is a matter of some debate. The most common assumption is that goals pre-exist and guide action. As March (1976) puts it:

> We find it natural to base an interpretation of human choice behavior on a presumption of human purpose. We have, in fact, invented one of the most elaborate terminologies in the professional literature: "values," "needs," "wants," "goods," "tastes," "preferences," "utility," "objectives," "goals," "aspirations," "drives." All of these reflect a strong tendency to believe that a useful interpretation of human behavior involves defining a set of objectives that (a) are prior attributes of the system, and (b) make the observed behavior in some sense intelligent vis-a-vis those objectives. . . . Individuals explain their own behavior, as well as the behavior of others, in terms of a set of value premises that are presumed to be antecedent to the behavior. Normative theories of choice begin with an assumption of a pre-existent preference ordering defined over the possible outcomes of a choice. (pp. 69-70)

These assumptions have been questioned on a number of grounds. Weick (1979), for example, drawing upon the phenomenological school of philosophy (e.g., Mead, 1956; Schutz, 1967), argues that the world is an unbounded stream of experience:

> The reader may object that his experience seldom has this quality of a continuous merging and melting of phases into phases. In fact, experience as we know it has the quality of being bounded, distinct, episodic, particular. But the only way a person can sense the separateness of experience is to step outside the stream of experience and direct attention to it. When a person does this it is only possible to direct attention at what has already passed, not at what is yet to come. All understanding originates in reflection and looking backward. . . . Actions are known only when they have been completed. (pp. 194-195)

Sociological studies of information processing and decision-making in organizational settings suggest that there are several characteristics of social settings which insure that something like this sort of retrospective sense-making takes place (the following points are drawn from March & Olsen, 1976).

First, individuals have only a limited amount of control over their environments, especially environments containing other social actors. Most social interaction is emergent; the actions of the various participants are not predictable or well specifiable in advance. Thus, the points at which choices become possible or necessary or at which beliefs and intentions become relevant, are uncertain or ambiguous.

Second, each actor possesses a multiplicity of goals (which may change over time). Different goals may derive from different sources or pressures. Goals may be inconsistent or in conflict.

Third, actors have limited capacities for attending to their goals. Not all goals can be attended to at once. Also, shifts in attention to goals are, at least in part, products of the availability of choice situations produced by the flow of social interaction.

Fourth, participation in interaction is fluid over time. People move in and out of the stream of events, carrying with them different sets of beliefs, problems, and modes of action, thus changing the configurations of situations in generally unpredictable ways.

Fifth, not all action is linked to the personal goals or motivations of the actors. Since, social situations are rule-bound, actors may be obligated to perform in a certain fashion, while exogeneous factors may constrain or direct action.

Sixth, events may be ambiguous. The actor may not know what has happened or why it happened (either because of ambiguity inherent in the event, or because of difficulties in observing or monitoring events).

Seventh, the reasons why things happen may be ambiguous. That is, it may be unclear why particular choices or actions produced particular outcomes (or even whether these choices and actions did in fact produce the "outcomes" observed).

When these conditions obtain, beliefs, problems, choice opportunities, actions, and outcomes are uncoupled, taking on independent dynamics and becoming variously linked and unlinked in the course of on-going interaction. Decision-making becomes what Cohen, March, and Olsen (1976) call a "garbage can" process:

> Suppose we view a choice opportunity as a garbage can into which various problems and solutions are dumped by participants. The mix of garbage in a single can depends partly on the labels attached to the alternative cans; but it also depends on what garbage is being produced at the moment, on the mix of cans available, and on the speed with which garbage is collected and removed from the scene.
>
> Although choice opportunities may lead first to the generation of decision alternatives, then to an examination of the consequences of those alternatives, then to an examination of the consequences in terms of objectives, and finally to a decision, such a model is often a poor description of what actually happens. (p. 26)

Instead, the argument continues, motives and intentions are discovered "post factum" (March, 1972). Beliefs and preferences may exist independently of any given sequence of events, but these beliefs are attached to events only after the fact (Cohen & March, 1974):

> From this point of view, an organization is a collection of choices looking for problems, issues and feelings looking for decision situations in which they might be aired, solutions looking for issues to which they might be the answer. (p. 81)

The perspective described above suggests that social interaction is embedded in situational uncertainties and ambiguities, and that people act sometimes in a goal-directed fashion, but sometimes in automatized, routinized ways, and sometimes on the basis of quickly shifting, sometimes transient, preferences. Given the limitations of human attention and cognitive capacity and the emergent, unpredictable nature of social interaction, it is impossible for people to keep their preferences well ordered and their actions well aligned with preferences. When people are called upon to account for their actions, they make sense retrospectively by invoking their consciously held and valued "goals" and orientations.

The evidential base of the retrospective-sense-making approach derives mainly from studies of group decision making or decision making in organizational settings (Allison, 1971; March & Olsen, 1976), where it can be shown that goals emerge in interaction and that organizational actions often bear no clear relationship to the goals of individual actors in the organization. It is inherently much more difficult to illustrate such retrospective sense-making in the actions of an individual because, according to the theory, people will always account for past actions in reasonable ways--appropriating their past actions in terms of their stated goals, and rationalizing discrepancies. The instance described below

suggests the difficulty of untangling the relationships of goals and actions.

In the first two stimulated recall interviews conducted with the teachers, researchers stopped the videotapes at the teachers' initiative (they had been prompted to stop the tape whenever they saw themselves making a decision or saw something on the tape they wished to comment on). With the third interview researchers also began stopping the tapes, asking the teachers for their thoughts at certain junctures which had not been addressed in the earlier interviews. In the one of the latter type of interviews, I stopped the tape and asked Mr. Franklin, a history teacher, what he was thinking as he asked a student a question. Mr. Franklin responded with a very long, coherent, and elaborate explanation of his questioning strategies (invoking such goals as trying to see who was listening and attending to the lecture, drawing usually nonparticipating students into the interaction, framing the question in a manner appropriate to the verbal skills of a particular student, and so on). Puzzled as to why he had not mentioned such a well articulated set of strategies in the earlier interviews, I ask him what made him decide when to say something to me about his thinking. He responded:

> (laughs) Well, I think if it's significant . . . I (laughs) . . . I don't know. Well, I just watch and listen . . . I don't know . . . You would've gotten me there, if you wouldn't have stopped [the tape], because I probably wouldn't have stopped it and thought about why I used a direct question . . . I mean why I used the question "May I see the hand of someone who can?" I don't know, I just do that all the time, it's just . . . I know when I was a student, teachers asked rhetorical questions all the time, and I always thought it was dumb, and when I was in my teacher education, I read that book, Classroom Questions: What Kind?, by Norris Sanders. I read that in the first education class I ever had when I decided I wanted to be a teacher. He told me why I thought a lot of my teachers were geese for asking these kinds of questions--that they didn't really want answers . . . what they really want to know is who doesn't understand.

There are several notable features in this series of explanations. First, Mr. Franklin acknowledges that the questioning is simply something he "does all the time" and that he didn't consciously reflect on it in the course of teaching (or interviewing). It is, in other words, an "operation" that has been automatized or routinized. Even more interesting is the fact that Mr. Franklin's explanations or rationalizations changed as he spoke. At first, he had explained the questioning strategy in terms of the immediate situation and in terms of the distribution of participatory opportunities. However, as he continued, he seemed to discover more and more reasons for his actions--finally, in the quote given above, tracing them back to his university training (incidentally, the goal of discovering who didn't understand had not appeared in his first set of explanations). It seems probable that Mr. Franklin, asked to explain a pattern of action he had not consciously attended to as it emerged, was in fact searching his memory for reasons or "goals" that would make sense of the action.

As already noted, the framework described above places great emphasis on the emergent, fluid nature of social situations. However, in most organizational settings the actors with the most legitimate power in those settings have the capacity to stablize or routinize some aspects of their situations. There are good reasons for doing this. As March and Simon (1958) suggest in their classic discussion of routinization:

> An individual can attend to only a limited number of things at one time. The basic reason why the actor's definition of the situation differs greatly from the objective situation is that the latter is far too complex to be handled in all its detail. Rational behavior involves substituting for the complex reality a model of reality that is sufficiently simple to be handled by problem-solving processes. (p. 151)

One of the most efficacious ways of simplifying reality is to segment it into discrete routines, "operations" or "programs" for action (March & Simon, 1958):

> An important objective of standardization is to widen as far as possible the range of situations that can be handled by combination and recombination of a relatively small number of elementary programs.
>
> Limitation of high-level action to the recombination of programs, rather than the detailed construction of new programs out of small elements, is extremely important from a cognitive standpoint. Our treatment of rational behavior rests on the proposition that the "real" situation is almost always far too complex to be handled in detail. (p. 150)

Thus, a teacher can simplify the emergent, unpredictable character of a classroom by establishing a "formal rationality" defined in terms of routines or programs for getting things accomplished (cf. Doyle, 1979a). By the "simplification" of reality through routinization, it can be argued that teachers are able to construct situations in which goals defined before the initiation of action sequences actually function to guide them.

To make this argument, however, would be to ignore the fact that the act of routinization isolates the routinized activity from other activities and defines the goals of its performance in a strictly technical fashion as the successful completion of the program. That is, the goals of the routine are to follow the rules of the routine and the place of the routine in the general vector of classroom processes becomes ambiguous (March & Simon, 1958):

> When tasks have been allocated to an organizational unit in terms of a subgoal, other subgoals and other aspects of the goals of the larger organization tend to be ignored in the decisions of the subunit. . . . [There is a] tendency [for] members of an organizational unit to evaluate action only in terms of subgoals, even when these are in conflict with the goals of the larger organization. (p. 152)

The proper performance of the routine or operation becomes more important than the attainment of the substantive aims to which the routine supposedly leads (cf. the common finding in teacher thinking research that, once initiated, routines are generally carried out to their conclusion, even when they're not working as they're supposed to, see Shavelson & Stern, 1981, p. 484). Thus, routines may play the role of prepackaged retrospective accounts. The teachers can explain their performances in terms of accomplishing their routines rather than in terms of fulfilling substantive goals (and when the routines break down, as in Mrs. Skylark's case, substantive goals can be invoked as reasons for subverting formal goals).

The perspective described above provides a way of looking at the goal-action relationship as a process of generating understanding in social interaction. However, it should also be noted that understanding one's goals and actions is not the same as talking about them. When people engage in the activity of "explaining" they are not operating in a social vacuum and merely trying to explain their actions to themselves. As Mills (1963) puts it:

> When an agent vocalizes or imputes motives, he is not trying to describe his experienced social action. He is not merely stating "reasons." He is influencing others--and himself. Often he is finding new "reasons" which will mediate action. Thus, we need not treate an action as discrepant from "its" verbalization, for in many cases, the verbalization is a new act. In such cases, there is not a discrepancy between an act and "its" verbalization, but a difference between two disparate actions, motor-social and verbal. (p. 444)

Explanations, then, are not simply infrastructural determinants of action, but are component actions of the interactions in which they are invoked. When people explain, they are not merely trying their best to recount their thoughts or intentions. They are also constructing

accounts in terms of what they understand to be socially acceptable modes of explanation. People make sense retrospectively for a purpose.

Conclusions

Research on teachers' beliefs, knowledge and thought processes has two central aims. One is to expand our knowledge of how teaching occurs. The second is to provide us with information about how to change or influence teaching practices. The arguments developed in this paper have both methodological and conceptual implications for these aims.

A number of conceptual issues have been raised about the role of cognition in teaching. It was shown that concepts and theories from cognitive psychology could serve as useful frameworks for talking about and framing issues related to teachers' classroom practices. At the same time, it was argued that the epistemological status of these frameworks was suspect. The paper elaborated a perspective for viewing teachers' understanding of their action as a product of social interaction. It was argued that goals are not necessarily pre-existing determinants of action, but are often discoveries after the act. This implies that the aim of teacher education must not be only to show teachers how different techniques and strategies can lead to the attainment of their goals. It cannot be assumed that there is a unitary "goal" of teaching that is consensually held. It is just as important to aid teachers in the discovery and identification of goals. In other words, it is not enough to teach teachers how to carry out the tasks of teaching, they must be taught to identify the tasks of teaching within the actual setting of practice. This implies a program of research that works towards identifying the sorts of social-interactive processes that lead teachers towards the formulation of certain types of goals, while teacher education

turns towards an examination of how interactive settings producing desired goals can be constructed.

Methodologically, the paper argues that our techniques for studying teachers' cognitive processes rely too much on the assumption that these processes are purely internal and intra-psychological. Instead, it is suggested that we need to attend more to the patterns of social interaction that teachers engage in, and that we recognize that within the research setting--in interviews, for example--teachers are not merely reporting their thoughts, but are engaging in the task of discovering their goals and defining the tasks of teaching.

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